UTILIZATION OF ENGINE COMPANY PERSONNEL TO CONDUCT FIRE INSPECTIONS

EXECUTIVE DEVELOPMENT

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ABSTRACT

The Murray City (UT) fire department had no standard operating procedure in place for engine company inspections, yet engine companies perform a large portion of the inspections. The purpose of this project was to evaluate the fire inspection program relating to engine companies, and to develop a procedure for adoption.

Evaluative and action research methodology were used to address the following research questions:

1. Is it effective to utilize engine company personnel in conducting fire inspections?
2. What element or elements of the company inspection program can be modified to improve the program?
3. What policies or guidelines can be developed to manage the engine company inspection program of the Murray City Fire Department?

The procedures involved the collection of data from inspections performed by engine companies, as well as those by Fire Prevention Division inspectors. The data was analyzed to determine what types of violations were being discovered by engine company inspections. A literature review was used to determine recommended practices and procedures utilized by other departments.

The results indicated that engine companies regularly identified fire code violations in the structures that they inspected. In addition, records revealed that the number of structure fires in Murray City had been declining in recent years. It was concluded that there were some areas of deficiency in the inspection

program, and a standard operating procedure was developed to address those concerns.

Recommendations resulting from this project included (a) the continued use of engine companies to perform fire inspections, (b) to provide additional and more technical training to engine company personnel and officers, (c) the improvement of the record keeping system, (d) the initiation of an aggressive follow-up procedure, and (e) adoption of the standard operating procedure developed as part of this project.

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INTRODUCTION

According to the National Fire Protection Association (NFPA, 1997), there are currently more than 30,000 fire departments in the United States that are organized in various ways to meet the specific needs of the communities they serve (p.10-3).

The specific organization of an individual fire department varies from location to location based on community needs and political philosophies. One of the responsibilities of a fire department is that of fire prevention, including fire education programs and fire code enforcement. One of the earliest recorded fire protection regulations dates back to 872 AD in Oxford, England. A curfew was adopted which required hearth fires to be extinguished at a fixed hour (NFPA, 1997, p. 10-3).

Today's fire departments are involved in fire code enforcement to varying degrees, ranging from a part-time inspector or fire marshal, to large fire prevention bureaus in major cities. Many fire departments throughout the years have utilized suppression firefighters who have suffered duty injuries to work "light duty" performing fire inspections while recovering from their injuries. Today's fire codes and standards are increasingly technical and require personnel who can devote a great deal of time and effort in the study and application of these codes. In general, suppression firefighters do not have extensive expertise in codes and standards, but they do have a basic knowledge of applicable fire codes. Yet suppression personnel have conducted nearly half of the fire inspections in Murray City in the past five years (see Appendix B).

This research project will address the problem that there are no established standards and/or guidelines in place in the Murray City Fire Department for engine companies (suppression personnel) relating to conducting fire inspections. Even though no standard operating procedure (SOP) exists, engine company personnel are expected to perform fire inspections on a regular basis.

The purpose of this project is to evaluate the fire inspection program of the Murray City Fire Department relating to engine company inspections.

Evaluative and action research methodology was used to address the following questions:

1. Is it effective to utilize engine company personnel in conducting fire inspections?
2. What element or elements of the company inspection program can be modified to improve the program?
3. What policies or guidelines can be developed to manage the engine company inspection program of the Murray City Fire Department?

BACKGROUND AND SIGNIFICANCE

The Murray City Fire Department, like many fire departments across the country, was first established as a volunteer organization to provide fire protection to the community. Organized on August 6, 1906, just four years after the City of Murray was incorporated, the fire department consisted of 25 volunteers. The department was authorized to purchase two hose carts at $160.00 each, one chemical engine for $900.00, one hook and ladder truck for

$450.00, four nozzles at $25.00 each, and seven aluminum hats for $30.00. The first full-time firefighter was put on the city payroll in March of 1964, and the first full-time Fire Chief was hired in July of 1965 (Murray City Corporation, 1976, pp. 34, 241).

By 1966, a fire prevention program was in place, reporting 57 inspections for the year, including schools, churches, and businesses (Murray City Fire Department, 1967, p. 7). The first full-time employee to be assigned to fire prevention was in 1973 when a captain was put in charge of the fire prevention bureau. During that year, the Murray Fire Department conducted 414 inspections (Murray City Fire Department, 1974, p. 9). A full-time fire marshal was appointed in 1979, a year in which fire inspection activity included 532 building inspections (Murray City Fire Department, 1980, p. 14). In 1998, fire department personnel performed 1826 inspections (including self-inspections), 818 of those by engine company personnel (see Appendix B).

In 1974, the fire prevention program, under the direction of Captain Earl Healy, outlined seven “important projects” for the department. Three of the seven are as follows:

- We are hoping to get more men out in the field doing inspecting work. We try to give all of our firemen a chance to get out of the fire station and give us a hand with our fire prevention work.
- We would like to increase our fire prevention budget considerably to enable us to purchase more fire prevention material. We would also

like to purchase a camera and slide projector which would enable us to give better training classes to the firemen, schools and the public.

- It is our goal to inspect every business once a year and the more hazardous ones two to three times a year. Every new business is inspected before occupancy is allowed (Murray City Fire Department, 1975, p. 8).

Inspections for new business licenses, new building construction and remodels, inspections for permits, as well as inspection of special events are conducted by members of the Fire Prevention Division. The suppression personnel are involved in what are referred to as "routine" business inspections. The purpose of these "routine" inspections is to identify and correct fire hazards in businesses as well as to provide a mechanism for suppression personnel to become familiar with the buildings and businesses in their districts.

In 1994, a "self-inspection" option was added to the inspection program in the department. The idea of the self-inspection program was to allow business owners in light (low) hazard occupancies to perform a fire inspection of their own businesses. They complete an inspection form provided by the fire department and return it to the department within ten days. In theory, this would free up engine companies to spend more time on inspection of larger and more hazardous occupancies.

As the inspection program has evolved, there have been no formal procedures or guidelines established for the success of the program, nor has there been any analysis of the program to determine its effectiveness or future

direction. Each suppression officer has been assigned districts to inspect, but without significant accountability for the success of the program.

Also at issue is the question of quality control. It is not unusual for Fire Prevention Division personnel to encounter significant violations that have been overlooked by suppression personnel. For example, in October of 1998, the Fire Marshal visited a private school to review a plan for a new building on the campus. During that visit, he and a Deputy Fire Marshal observed numerous serious violations that lead to an order to close two of the school buildings after a complete follow-up inspection was made. This school was inspected by suppression personnel just two months prior to the Fire Marshals' visit, noting only minor violations such as exit signs not illuminated and past due maintenance of fire extinguishers.

The evaluation of the engine company inspection program relates to the *Service Quality/Marketing* module of the *Executive Development* course at the National Fire Academy.

LITERATURE REVIEW

The literature review was conducted utilizing trade journals, fire service training and reference books, internet searches, and review of previous research conducted by students of the Executive Fire Officer Program (EFOP).

Research Question 1. Is it effective to utilize engine company personnel in conducting fire inspections?

Among the stated objectives of a fire department, the prevention of fire is a primary goal. Fire prevention measures include fire safety education, fire

prevention inspection, and fire code enforcement. There are many organizational approaches to assigning responsibility for fire prevention functions. One of the most promising concepts is that of a fire management area for utilizing company personnel for fire duties in their response territories (Robertson, 1995, pp. 43, 44, 51).

Chief Larry D. Donner (1997) of the Boulder, Colorado, Fire Department reports that "in Boulder, fire suppression companies provide the backbone of our inspection program." Chief Donner continues:

> Departments that use fire companies to do inspections usually spend a great deal of effort balancing workloads between stations, shifts and crews. Developing an effective system to manage inspection workloads is critical to the success of a company inspection program (p. 100).

The City of Hopewell (VA) Bureau of Fire inspects all commercial buildings "to detect fire hazards in accordance with the Virginia Statewide Fire Prevention Code." Hopewell personnel inspect at varying frequency depending on risk. Routine business fire inspections are conducted by on-duty personnel supported by fire prevention personnel (Hopewell Bureau of Fire, 1999, p. 1).

Robertson (1995) cites the success of the Cincinnati, Ohio, Fire Division as having "maintained an outstanding inspection program for many years," and believes that their procedures, which include the inspection of all buildings, including homes, are "worthy of study and emulation by other cities" (p.51). The Cincinnati Fire Division describes the system as follows:

> Fire Companies, weather permitting, take their apparatus to pre-designated locations and while one member stays with the apparatus and remains “IN SERVICE” by two-way radio, the rest of the company members inspect in the vicinity under the supervision of the Officer In Charge of the company. Companies assigned to this program rotate according to the District Marshal’s schedule. This is done so that all companies participate, but in such a fashion that adjoining companies are not out inspecting at the same time. This program called the Unit Block Inspection Program has enabled the department to increase the total number of inspections and allow a heavy concentration of effort in residential areas. With this method the company is never out of service for fires or other emergency runs. This type of inspection also gives our citizens a good opportunity to view the apparatus and ask questions relative to their fire department. They may also receive fire safety instructions and literature from the member who stays with the apparatus. The children get a first-hand view of “the big red fire engines.” Experience has shown that in addition to performing a valuable service, the program creates good public relations in the neighborhood being visited (Cincinnati Fire Department [as cited in Robertson, 1995, pp. 51, 52]).

The Solana Beach (CA) Fire Department (1999) has a goal to inspect all business occupancies a minimum of once each calendar year utilizing engine company inspections. Complex inspections such as group E (educational), group I (institutions such as hospitals and prisons), and group H (hazardous)

occupancies are performed by either the Fire Marshal or Fire Prevention Specialist (p. 1).

According to research done by Hall, Koss, Schainblatt, Karter, and McNerney (1979) for the National Fire Protection Association:

1) Cities that annually inspected all (or nearly all) properties appeared to have lower fire rates than did cities that did not inspect all (or nearly all) inspectable properties; and
2) Cities that used suppression personnel to perform a significant portion of their fire code inspections tended to be much more successful in achieving annual frequency than were the cities that did not use suppression companies (pp. 30, 31).

In addition, this study concludes that "there is a strong relationship between lower fire rates and the use of suppression companies for fire-code inspections," yet "in interviews in all the cities (involved in the study), both the companies and full-time inspectors agreed that company personnel were less able to spot violations" (pp. 40-41).

B.J. Dean (1991) of the Kingsport (TN) Fire Department studied the question of utilization of suppression personnel in fire prevention. Although some chief officers resisted his findings, it was his conclusion that "the use of firefighters to increase the number of maintenance inspections is a very effective way of delivering prevention services at a minimum cost to the citizens." Dean also concluded that "the firefighters would be more productive while providing a valuable and needed service" (pp. 11, 13).

Research Question 2. What element or elements of the company inspection program can be modified to improve the program?

Harry R. Carter (1989), a fire protection consultant, strongly believes in preventing fires before they occur. Mr. Carter states that:

> The first step toward the development of a successful, proactive fire prevention program in any fire organization must come from the top. The prevention of fires must become a declared, written policy of the fire department, from top to bottom (p. 22).

Donner (1997) suggests that inspection quotas that are unrealistic will have an adverse effect on engine company inspections. Company officers assigned too many inspections will 1) run out of time, 2) intentionally blow off complex inspections, or 3) do quick, and sometimes sloppy, inspections in an effort to meet a quota (pp. 100, 102).

Another factor that effects the quality of engine company inspections is that of training of personnel. NFPA (1991) suggests that before firefighters perform inspections they should receive proper training and be qualified and authorized to conduct inspections (p. 9-72).

The International Society of Fire Service Instructors (ISFSI, 1987) has addressed the issue of training fire service personnel in inspections as follows: “A structure to train within has already been created; NFPA 1031 defines performance objectives to which an inspector can be trained. The training is not and should not be a one-time effort.” According to ISFSI, the training must come in phases: basic training for entry level personnel; in-service training for all

personnel; refresher training as necessary based on request or need; periodic training based on evaluation and assessment of the program, new codes, and staff performance; and reporting requirements (pp. 2, 5).

As part of a streamlining of their fire inspection program, the Bakersfield, California, Fire Department retained a consultant to train shift personnel in inspection of assembly occupancies. Engine and truck company personnel spent five hours of training in a classroom setting, followed by two hours of on-site inspection training. A short test was administered at the completion of the training, and those who passed the exam received a certificate of completion attesting to their increased skills (American Fire Journal, 1990, P. 16). Baltimore County (MD) suppression personnel were provided with a two-day classroom training session followed by one day in the field (Parks, 1990, p. 3).

Harry R. Carter (1989) addresses another area of quality control in an inspection program:

> An essential part of any fire inspection program is the development of an effective and accurate recordkeeping system. Such a system would be one which establishes a baseline for community fire safety as it currently exists and then has the capacity to track the success (or failure) of your efforts in the fire inspection area (p. 22).

Carter also addresses the need for the use of computers in an inspection program:

> Computers are no longer the wave of the future, they are the here and now, and should be used to the greatest extent possible. See that daily

inspection is entered into some form of computer on a daily basis. In this way, time can be saved in generating penalty forms, reports and lists of follow-up inspections, thus creating a more effective operation (pp. 22-23).

Research Question 3. What policies or guidelines can be developed to manage the engine company inspection program of the Murray City Fire Department?

Diamates (1998) wrote: “Although the model codes mandate the inspection of most structures and premises, they do not establish inspection priorities or frequency. These issues must be determined by local jurisdiction based on need and available resources” (p. 17).

The Baltimore County (MD) Fire Department (1989) standard operating procedure (S.O.P. #400-69) provides a good backbone for a company inspection program. This S.O.P. is organized into sections and sub-sections and is brief yet thorough. It contains the objectives of the program followed by general guidelines. Section one addresses the occupancies to be inspected and section two spells out the responsibilities of the Fire Prevention Office, the Battalion Chief, and the Company Officer. The subsequent sections (three and four) address activities prior to the inspection and inspection procedures, respectively. Section five of the Baltimore County procedure addresses re-inspection policies, followed by inspection scheduling in section six. Section seven relates to re-inspection scheduling, and section eight covers the fire inspection report form (pp. 1-6).

In 1980, Dennis McDonald, an associate editor of Western Fire Journal, wrote:

> The resource that measures the ability of its manager… is time and that time is a resource that critics argue, "there's lots of and it's under utilized." In many departments, this argument appears to be the case, because they lack the simple procedures of time management and accounting (p. 22).

McDonald continues by explaining that the area where time management appears to be lacking in many departments is the area of management of daily routine activity. He feels that most departments "lack that simple, effective organization that provides for accounting of time into specific, distinct areas for management purposes" (p. 23).

PROCEDURES

Data was collected from 200 engine company inspection reports from 1998. This represents 30% of the total engine company inspections performed. These reports were selected at random. Each inspection report was analyzed to determine what types of fire code violations were being identified by engine company personnel while conducting inspections. Also included in this analysis were the numbers of violations recorded per inspection.

Data was then collected from 200 new business license inspections conducted by fire prevention personnel. This represents 26% of the total business license inspections performed. That data was then compared to the engine company inspection data to evaluate any major discrepancies between the findings of the two divisions.

Inspection records for the past five years were analyzed to determine the number of inspections performed by engine companies. This included a comparison of number of regular company inspection versus numbers of self-inspections. Also analyzed in this project was the number of hours of inspection training logged by engine company personnel over the past five years.

A literature review was conducted as part of this research project to determine what recommended practices and procedures were contained in trade journals, fire service training and reference books, internet searches, and previous research conducted by students of the Executive Fire Officer program. Inspection policies of other departments were reviewed to determine what procedures should be adopted in Murray City. The Baltimore County (MD) Fire Department (1989) Standard Operating Procedure (SOP) #400-69 was targeted as a model procedure to use as a backbone for a new SOP for Murray City Fire Department.

Limitations

This research project was limited by several factors. Because the inspection reports used in the analysis were selected at random, the occupancy of the businesses inspected was not considered. Obviously, some occupancy types are subject to more serious fire code violations than others. For example, low hazard occupancies such as general business offices are not likely to have code violations related to storage or use of flammable liquids. The mix of occupancy types in the analysis is unknown.

Another limiting factor is in the comparison of engine company inspections to Fire Prevention Division inspections. The types of inspections generally conducted by engine companies are not exactly the same as those of Fire Prevention Division inspections. Engine companies typically inspect existing businesses for compliance, while Fire Prevention Division inspectors usually inspect new businesses at the time they apply for a business license. While the same code requirements are in place, some types of violations, such as the lack of fire extinguishers, is more typical in a new business while maintenance issues, such as storage violations, are more common in existing businesses.

Only inspection data from the Murray City Fire Department was utilized in this project. There is no data available in this research project to compare inspection numbers with other departments.

Furthermore, dollar loss figures were not used in this project. This researcher believes that dollar loss figures are not an effective measurement of inspection effectiveness. Dollar loss figures are generally unverified estimates by the initial company officer and may not be accurate. Also, a single fire incident may cause millions of dollars of damage, while multiple incidents in other reporting periods may show a considerably lower loss. A better gauge is the number of occurrences of structure fires.

Perhaps the most limiting factor of all is the reality that there is no way to definitely determine the number of fires prevented, the amount of property preserved, and the number of lives saved as a result of a fire inspection program.

Definition of Terms.

Fire Marshal. A chief officer appointed by the fire chief with the responsibility and authority to enforce all fire codes and ordinances.

Occupancy. The purpose for which a building or part thereof is used or intended to be used (International Fire Code Institute, 1997, p. 18).

Suppression personnel. Personnel who are assigned to engine or truck companies with the primary responsibility to respond on emergency calls, both fire and medical.

RESULTS

Research Question 1. Is it effective to utilize engine company personnel in conducting fire inspections?

Over the past five years, the number of emergency responses by engine companies in the Murray Fire Department have leveled off, and have actually decreased in the past two years (see Appendix C). In 1998, there were 2123 calls for emergency medical response and 807 calls for fire response. This represented an average of eight total emergency calls per shift. Assuming an average of 30 minutes per call (actual average time spent on non-medical response was 23 minutes), this would equate to approximately four hours per 24-hour day divided among three stations. Other mandatory assignments for the engine companies in a day include approximately two hours for training, one hour for apparatus maintenance, one hour for station maintenance, and one hour for physical training. During the course of most shifts, a company officer will have the time available to do inspections for at least two hours.

The evaluation of the 200 inspections conducted in 1998 shows that 78.5% of all inspections conducted by engine companies identified at least one code violation. The Fire Prevention Division inspections identified at least one code violation in 60% of the inspections. Over one half (52%) of the inspections conducted by engine companies had two or more violations reported while about one-third (34.5%) of the Fire Prevention Division inspections reported two or more violations (see Table 1).

Table 1.
Number of Violations Found in 200 Randomly Selected Fire Inspections

	Engine Company Inspections		***Fire Prevention Div. Inspections***	
NO VIOLATIONS	43	21.5%	80	40.0%
1 VIOLATION	53	26.5%	51	25.5%
2 VIOLATIONS	40	20.0%	32	16.0%
3 VIOLATIONS	36	18.0%	15	7.5%
4 VIOLATIONS	9	4.5%	15	7.5%
5 + VIOLATIONS	19	9.5%	7	3.5%
TOTAL	**200**	**100.0%**	**200**	**100.0%**

The specific violations identified by the engine company inspections as well as those by the Fire Prevention Division inspectors are found in Table 2. According to this research, the improper use of extension cords was the most common violation found by engine company inspections, noted on nearly one-third (31.5%) of the inspection reports. There were a total of 149 electrical violations identified in the 200 inspections by engine companies. The largest single violation found by Fire Prevention Division inspections was that of insufficient fire extinguishers (35.5%).

This research clearly indicates that the frequency and types of violations found by engine company inspections differ from the violations found at the time the initial business license is issued.

Table 2.
Violations Found in 200 Randomly Selected Fire Inspections[a]

	Engine Company Inspections		*Fire Prevention Div. Inspections*	
VIOLATION	**NUMBER OF VIOLATIONS**	**PERCENT[b]**	**NUMBER OF VIOLATIONS**	**PERCENT[b]**
Electrical cover plates	33	16.5%	23	11.5%
Blanks missing in electrical panels	21	10.5%	7	3.5%
Extension Cords	63	31.5%	13	6.5%
Electrical panel blocked	16	8.0%	10	5.0%
Misc. electrical violations	16	8.0%	5	2.5%
Alarm system violation	0	0.0%	3	1.5%
Extinguisher blocked	3	1.5%	0	0.0%
Extinguisher needs mounted	34	17.0%	12	6.0%
Extinguisher needs maintenance or recharge	45	22.5%	26	13.0%
Insufficient extinguishers	17	8.5%	71	35.5%
Extinguishing system required but not in place	0	0.0%	1	0.5%
Sprinkler\Extinguishing system needs service	14	7.0%	4	2.0%
Insufficient Sprinkler Heads	0	0.0%	13	6.5%
Storage around fire sprinkler riser	0	0.0%	4	2.0%
Storage too close to ceiling	22	11.0%	6	3.0%
Storage too close to furnace or water heater	17	8.5%	9	4.5%
Misc. storage	13	6.5%	1	0.5%
Exit blocked or locked	8	4.0%	2	1.0%
Exit door\exit hardware\other exit problem	2	1.0%	3	1.5%
Exit light problem	15	7.5%	8	4.0%
Emergency light problem	4	2.0%	2	1.0%
Insufficient exits	1	0.5%	1	0.5%
Blocked aisles	6	3.0%	4	2.0%
Furnace problem, misc.	1	0.5%	0	0.0%
Dumpster too close to building/openings	0	0.0%	2	1.0%
Flammable liquid storage problem	6	3.0%	3	1.5%
Unsecured compressed cylinders	15	7.5%	5	2.5%
LPG violation	0	0.0%	1	0.5%
Hazardous Materials violation	0	0.0%	1	0.5%
Spray booth problems	1	0.5%	7	3.5%
Misc. other	25	12.5%	17	8.5%

[a]Fire Prevention Division Inspections are primarily new business license inspections.
[b]PERCENT shows % of reports with this violation, NOT % of overall violations.

Research Question 2. What element or elements of the company inspection program can be modified to improve the program?

This research discovered that there is no mechanism in place to track follow-up inspections. Of the 200 inspection reports considered, only 58 (29%) indicated “No Follow-up Required” on the inspection report. Because the engine companies had been instructed to turn in the original report form after the initial inspection, there was no record of follow-ups on the remaining 71% of the inspections, with no way to know how many, if any, were being conducted. Another area of deficiency identified by this research is that of training. Several authors in the literature review addressed the issue of training. The training records of the Murray Fire Department were reviewed for the past five years. Only one-half year of records was available in 1994, the year that the current record keeping system was put into place. The research found that over that period of time, the highest average number of hours of inspection training delivered to each engine company member in a year was 6.5 in 1995. The research indicated a decline in the number of inspection training hours for engine company personnel over that period (see Table 3). In 1998, no formal inspection training was delivered to engine company personnel. To expect a quality delivery of any type of service, adequate and on-going training must be addressed.

The extent of computerization of records in the Murray Fire Department consists of the entry of inspection information with very little detail on a mainframe AS-400 system. The reporting capability of this system is nearly non-

existent. Hard copy inspection reports are filed by year in alphabetical files, although individual inspection reports are not alphabetized. In other words, all inspections with a business name that begins with "A" are in the "A" folder, but not in alphabetical order within that folder. Additionally, all types of inspections are filed together, including engine company inspections, self-inspections, business license inspections, and building inspections for new construction.

Table 3.

Inspection Training Hours 1994 - 1998

	Engine Company Personnel		***Fire Prevention Division Personnel***	
Year	**Total Hours**	**Average per Individual**	**Total Hours**	**Average per Individual**
1994*	105	3.5	-	-
1995	216	6.5	150	75.0
1996	155	4.7	126	63.0
1997	134	4.0	76	38.0
1998	0	0.0	142	47.3

***1994 records are for last half of year only. No data is available for Fire Prevention Division in 1994**

Research Question 3. What policies or guidelines can be developed to manage the fire inspection program of the Murray City Fire Department?

A standard operating procedure (SOP) for engine company inspections was developed as a result of this research project (see Appendix A). The new SOP is a blend of information from *Fire Prevention: Inspection and Code Enforcement* (Diamantes, 1998), *Fire Inspection and Code Enforcement*

(International Fire Service training Association, 1993), The *Uniform Fire Code* (International Fire Code Institute, 1997), the Baltimore County SOP #400-69, and original policies developed by the Murray Fire Department Fire Prevention Division personnel. The new Murray SOP will consist of ten major sections:

I. Occupancies to be Inspected

II. Responsibilities

III. General Inspection Policies

IV. Inspection Procedures

V. Re-Inspection (Follow-up) Procedures

VI. Inspection Report Form

VII. Pre-Citation Letter

VIII. Self-Inspections

IX. Residential Inspections

X. Record-Keeping

DISCUSSION

The results of this project strongly indicate that it is effective to utilize engine company personnel in conducting fire inspections. It is clear that it is effective to use engine company personnel between emergency calls and other duties to perform fire inspections. The fire department owes it to the community that it serves to do everything it can to save lives and property by *preventing* fires, not just fighting them. According to the International Fire Service Training Association (1993), “fire prevention inspections are the single most important non-fire fighting activity performed by the fire service” (p. 5).

This research project revealed that nearly 80% of inspections by engine companies identified at least one fire code violation, and that nearly 75% of the businesses that had violations had at least one violation of electrical nature. NFPA (1997) reports that during the period of 1989 to 1993 there were 85,510 structure fires reported that were caused by electrical failure. Of those fires, nearly half (40,350) were attributed to electrical distribution equipment, such as fixed wiring, meter boxes, circuit breakers, light fixtures, cords or plugs, etc. Another 11,110 of the electrical fires were the result of appliances or tools (pp. 3-5, 3-10). NFPA also states that "flexible cords are frequently subject to physical damage and rapid wear. Grounds or short circuits may occur if the insulation is damaged, and the resulting arc may ignite the insulation or nearby combustible material" (p. 3-23). It would stand to reason that the identification and subsequent elimination of electrical problems during engine company inspections reduces the chances of a fire in that occupancy.

With one exception, the number of structure fires in Murray City in the last five years has declined each year (see Table 4). Although there were more incidents of structure fires in 1997 than in 1996, the overall downward trend would indicate that the inspection program, of which the engine company inspections are a significant component, is a success.

The Fire Prevention Division has responsibility for plan reviews, new building inspections, permits, business license inspections, handling complaints and questions, and code enforcement (citations) with only three individuals. It is clear that the effectiveness of the Murray Fire Department inspection program

would be greatly diminished without the involvement of the engine companies in the program.

Table 4.
Number of Structure Fires in Murray City in the Past Five Years

Year	Number of Incidents
1994	114
1995	109
1996	70
1997	93
1998	60

In considering what element or elements of the company inspection program can be modified to improve the inspection program, the area of training is one that must be addressed. With proper training, engine company personnel will not only be better qualified to perform the inspections, but they will also have a better attitude about what they are doing. Some firefighters and engine company officers have made comments such as “we are going out to harass the public” when leaving to do inspections. This indicates a lack of knowledge of inspections and their importance. The Bakersfield Fire Department felt so strongly about the need for a quality inspection program that they retained a consultant to train their personnel (American Fire Journal, 1990, p. 16). Company officers should be trained to a higher level than line firefighters, and should assist in the in-service training of firefighters.

When the now famous report *America Burning* was released in 1973, the National Commission on Fire Prevention and Control identified the need for fire

data. The Commission reported that “in studying the fire problem, in searching for solutions – this Commission found an appalling gap in data and information that effectively separated us from sure knowledge of various aspects of the fire problem” (p. 9). So it is with the inspection program in a local fire department. In order to effectively manage the inspection program, there must be reliable data available through an effective record keeping system. A modern, computer based system capable of providing adequate reports is essential. Adequate records and reports will increase the accountability of the engine companies.

There are policies or guidelines that should be developed to improve the fire inspection program of the Murray City Fire Department. A standard operating procedure (SOP) for the company inspection program must be comprehensive and detailed. First, the SOP needs to identify the occupancies to be inspected. The Cincinnati, Ohio, Fire Department includes homes in their engine company inspection program (Robertson, 1995, p.51). The SOP should detail the responsibilities of all involved members of the department. The policy must include general inspection policies along with more specific inspection procedures. Specific policies leave little question as to whether the inspections are within the scope of the job.

One of the areas of deficiency in the company inspection program of the Murray Fire Department identified in this project is that of re-inspections (follow-ups). The International Fire Service Training Association (1993) recommends that “follow-up inspections are made to ensure that the recommendations made in the inspection report have been followed” (p. 29). The International Fire Code

Institute (1997) recommends that fire departments “achieve compliance by traditional means of inspection, notification, granting of time to comply and re-inspection” (p. 329). There must be a specific policy in place to ensure that the follow-up inspections are not only completed, but documented as well. A complete SOP will also include information on completion and distribution of the inspection form, as well as when and how to issue a pre-citation letter. Because Murray Fire Department has an option of a self-inspection program, the SOP should contain a section dealing with self-inspection policies. Because residential inspections are handled differently in Murray City than commercial inspections, a section outlining residential inspection policies is appropriate. Finally, a section to deal with record keeping is needed to complete the SOP. This research project will result in the development of a new standard operating procedure for engine company inspections in the Murray City Fire Department (see Appendix A).

RECOMMENDATIONS

It is the recommendation of this researcher that the Murray City Fire Department continues to utilize engine companies to do fire inspections. The research supports the affirmative to this question. However, there are areas of deficiency that need to be addressed to better manage, and thus improve this program.

Engine company personnel should be provided more training than they are currently provided. It is necessary for the Fire Prevention Division to provide additional and more technical training. Furthermore, engine company officers

should be trained to a higher level than firefighters, such as Fire Inspector I (through NFPA or Utah Fire & Rescue Academy) so they can assist in training and motivating firefighters. Training engine company officers in time management is also recommended, as well as a requirement for accountability of time spent during the day.

It is further recommended that the inspection record keeping system be improved to include computerized inspection records with substantial reporting capability. NFPA (1991) states that "well-organized and well maintained inspection files and building records are essential foundations for enforcement actions. Complete and accurate records also are needed to measure fire department effectiveness in accomplishing fire prevention goals." NFPA concludes that computer technology is helpful in handling records and in managing fire prevention programs. "Fire prevention reporting systems should be designed to collect, store, and process data and to schedule periodic activities according to local policy" (p.9-75).

An aggressive, well-managed follow-up procedure is needed to make the company inspection program successful. It is recommended that the Murray City Fire Department adopt the standard operating procedure (SOP) developed as a result of this research project (see Appendix A). This SOP addresses the follow-up problem, along with other areas of deficiency identified in this project. The policy also gives detailed procedures to standardize the inspections on all shifts.

Finally, periodic reviews of the inspection program should be conducted and detailed feedback given to the company officers. This communication is

essential in gaining and keeping the support of those involved in the program. According to Mackenzie (1990), “communication is not simple, but it is the medium in which work gets accomplished, and so it behooves us to learn better techniques” (p.167).

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APPENDIX A

STANDARD OPERATING PROCEDURE
Engine Company Inspection Program

OBJECTIVE: To establish policies and procedures for the inspection program for engine company personnel.

Section I: **OCCUPANCIES TO BE INSPECTED.**

A. Residential.

1. Inspect common areas, including exterior of all apartment and condominium complexes.
2. Inspect single family residences upon request of the occupant.

B. Places of Assembly (eating & drinking establishments, amusement & entertainment establishments).

C. Educational. Inspect assigned public schools during summer vacation.

D. Mercantile.

E. Industrial.

F. Storage Facilities. Inspect all common areas.

Section II: **RESPONSIBILITIES**.

A. Fire Prevention Division.

1. Provide technical assistance and training.
2. Distribute inspection assignments.
3. Follow-up on inspections when the engine company has been unsuccessful in gaining compliance.
4. Issue citations and/or notice of violation when necessary.

B. Battalion Chief.

1. Ensure that engine companies complete inspections within the established deadlines.

C. Company Officer.

1. Become familiar with applicable codes, standards, and ordinances.
2. Ensure that engine company inspections are performed in accordance with this policy and in a professional manner.
3. Maintain an inspection file of most recent inspections.

Section III: **GENERAL INSPECTION POLICIES.**

A. Fire inspections shall be conducted on a regular basis, generally a minimum of two hours per shift.

1. Evening inspections shall be scheduled for occupancies that are not normally open during the day.

B. In general, engine companies will remain in-service while conducting inspections.

1. The company officer may allow one individual to remain with the apparatus if he/she deems it appropriate.

a. In those cases, that individual shall have fire prevention materials on hand to distribute to members of the public who may stop to inquire.
b. In no case shall the individual remaining with the engine engage in sleeping or the conducting of personal business.

C. All members of the engine company shall:

1. Familiarize themselves with the occupancy to be inspected. Review previous year inspection report prior to the inspection.
2. Be in proper uniform, all members in same uniform.
3. Conduct themselves in a professional manner.
4. Not conduct personal business, including phone calls.
5. Not handle or purchase merchandise.

Section IV: **INSPECTION PROCEDURES**.

A. Entry.

1. Always enter through the main entrance.
2. Introduce yourself and explain the purpose for the visit (to conduct a fire prevention inspection) and request permission to perform the inspection.
3. Request a guide to accompany you during the inspection. If valuables are involved, insist on a guide.

B. Entry Refused.

1. Permission to inspect must be obtained prior to conducting an inspection.
2. If entry is refused because it is not a convenient time, make an appointment that is agreeable to your schedule and the occupants.
3. If the occupant refuses entry and refuses to make an appointment, leave courteously and notify the Fire Prevention Division in writing.
4. Inspection of areas visible from the public way does not require permission from the owner.

C. Conducting the Inspection.

1. After gaining entrance and receiving permission to do the inspection, obtain the information to complete the top of the inspection form.
   a. Include the name, address, phone numbers, and business license number of the business.
   b. Obtain the name and phone number of two responsible individuals to contact after hours.

2. Begin the inspection on the outside of the building, noting fire department access, hydrant accessibility, condition and accessibility of outside indicating valves, viability of exit discharges, etc.

3. Conduct the inspection of the interior using a systematic approach, either from the top floor to the lowest or lowest to top.

4. Inspect every room and space within the building.

5. The engine company shall remain together during the inspection as much as possible. *Exception: The engine company may be split up to do separate inspections in adjacent businesses.*

6. Proceed with the inspection making notations of violations on the inspection report form. Write clearly and legibly, including as much detail as necessary.

   a. If during the inspection a life hazard or hazardous condition is noted, obtain immediate compliance if possible.
      EXAMPLES:
      Life Hazard – Exit doors blocked, chained, or locked.
      Hazardous Condition – Unsafe use of flammable liquids.
   b. If unable to secure immediate compliance, contact the Fire Prevention Division immediately.

7. On completion of the inspection, conduct a closing interview with the guide. Discuss those conditions that need corrected as well as note good conditions.

8. If no violations are found, check the "No Violations Noted" box at the bottom of the inspection report.

9. If one or two minor violations are noted and, in the opinion of the company officer, no follow-up inspection is necessary, check the "No Follow-up Required" box.

10. Significant or multiple (three or more) violations require follow-up.

11. Have occupant sign the report to acknowledge receipt and then issue him/her the pink copy of the report.

12. If a re-inspection is needed due to violations, set a time for re-inspection per Section V of this S.O.P.

13. Express appreciation to the occupant for his/her time, and for their efforts in promoting fire safety in their business. Always be courteous and professional.

Section V: **RE-INSPECTION (FOLLOW-UP) PROCEDURES.**

A. It is important for follow-up inspections to be performed as scheduled by the same engine company to establish credibility for the inspection program.

1. If upon re-inspection all violations are corrected, make note in the follow-up record on the bottom left of the original report form.

2. If all violations have not been corrected, note what corrections have been made and schedule a second re-inspection date for items not in compliance.

    a. If the occupant indicates that he/she will not comply, present occupant with a pre-citation letter, completed and signed by the officer and occupant. Attach original letter to original inspection report and refer the case to the Fire Prevention Division. Check the box "Refer to Fire Marshal" at the bottom of the inspection report form.

3. If the occupant has not made necessary corrections after the second follow-up inspection, present occupant with a pre-citation letter,

completed and signed by the officer and occupant. Attach original letter to original inspection report and refer the case to the Fire Prevention Division. Check the box "Refer to Fire Marshal" at the bottom of the inspection report form.

B. Hazards pertaining to Other Agencies/Departments.

1. When hazardous conditions exist that fall into the jurisdiction of other departments, such as Building Department, Electrical department, Health Department, etc., the inspection report shall be forwarded to the Fire Prevention Division with a note attached "Referral" with a brief description of the problem.

2. The Fire Prevention Division will channel these to the proper department.

C. Re-Inspection Schedule.

1. When violations are noted on the initial inspection, a re-inspection must be scheduled to assure compliance.

2. The officer in charge will determine the date for re-inspection using the following guidelines:

    a. If a re-inspection is needed, give the occupant this date at completion of the initial inspection.
    b. Minor violations (not life threatening): 15 – 30 days
        1) Poor housekeeping
        2) Exit light not working
        3) Fire extinguisher maintenance past due
    c. Serious violations (life hazard or threat): Immediate compliance
        1) Blocked, locked or obstructed exit
        2) Improper storage or use of flammable liquids (0 – 14 days)
    d. Major violations:
        1) Violations requiring major modifications (more than 30 days)
            a. Sprinkler system installation.
            b. Insufficient exits.
        2) Depending upon the modifications needed, an extended period of time may be required.
        3) Notify Fire Prevention Division in these cases.
    e. Note date of re-inspection on the follow-up record on the inspection form and mark "yes" or "no" on compliance.

D. Second Re-Inspection.

1. If after completion of the first re-inspection all violations have not been corrected, a second re-inspection should be scheduled.
   a. Allow one-half the time allowed for the initial re-inspection.

2. Record the date of the second re-inspection on the follow-up record on the form and mark "yes" or "no" on compliance.

3. If violations have not been corrected on the second re-inspection, mark the "Refer to Fire Marshal" box on the form. Present occupant with a pre-citation letter, completed and signed by the officer and occupant. Attach original letter to original inspection report.

4. Forward the original form to the Fire Prevention Division after the second re-inspection.

Section VI. **INSPECTION REPORT FORM.**

A. General Information.

1. Use black ballpoint pen, write firmly (3 copies) and legibly.

2. All information shall be printed, except for signature.

B. Distribution.

1. Pink copy to business at conclusion of initial inspection.

2. Yellow copy retained by inspecting officer until entire district is complete.

3. Original (white) copy to be forwarded to Fire Prevention Division when:

   a. There are no violations found.
   b. There is no follow-up required.
   c. Compliance is obtained after first or second re-inspection.
   d. When inspection is referred to Fire Marshal.

Section VII. **PRE-CITATION LETTER.**

1. Pre-citation letters shall be issued by the inspecting company officer in accordance with section V.

2. The officer shall complete the form letter by filling in all blanks, including date issued, business name and address, date of original inspection, re-inspection date(s), and approximate date of follow-up by the Fire Prevention Division.

    a. The Fire Prevention Division follow-up date should generally be within 5 to 10 working days of the pre-citation letter. This number may be less if the situation dictates.

3. The officer in charge shall sign the letter, and request a signature from the responsible party receiving the letter, along with the date, printed name of the individual, and his/her title.

    a. If the occupant refuses to sign the letter, make note of the refusal on the letter and leave a copy with the occupant.

4. Distribution.

    a. Original (white) copy shall be attached to the original (white) inspection form.
    b. Yellow copy shall be attached to the yellow inspection copy.
    c. Pink copy shall be given to the business owner/occupant.

Section VIII. **SELF-INSPECTIONS.**

A. General.

1. The self-inspection option may be utilized if desired by the company officer if the business meets all of the following criteria:
    a. Office and retail space, OR
    b. Medical Offices without medical gases, AND
    c. The square footage of the business in less than 6000 square feet, AND
    d. There is no history of major or repeated violations.

2. A detailed record of business involved shall be maintained by the company officer. Any inspection reports not returned within 10 working days shall require an inspection by the fire department.

3. All businesses shall be inspected every three years by the fire department.

Section IX: **RESIDENTIAL INSPECTIONS.**

A. General.

1. Inspect the inside of residential occupancies ONLY in the following situations:

   a. By request of the resident of the home.
   b. If an imminent hazard exists in plain view of the street.
   c. If in possession of a search warrant or administrative warrant.

2. Always have the resident accompany fire department personnel on the tour. NEVER allow your personnel to be unattended in the residence.

3. For protection of fire department personnel, avoid situations in which personnel are alone in a residence with a member of the opposite sex.

4. Always be courteous and professional.

B. Record keeping.

1. Record the inspection on a standard fire inspection report, noting "RESIDENTIAL INSPECTION BY OCCUPANT REQUEST" on the inspection form.

2. Forward original report to office for filing.

C. Re-inspection.

1. Follow-up inspections will not generally be done on a residential inspection unless:

   a. requested by the occupant, OR
   b. serious life safety issues were found.

2. If the inspection reveals a need for inspection by other agencies, such as Health Department, Family Services, Electrical, etc., follow the procedures outlined in Section V, B.

Section X: **RECORD KEEPING.**

A. Inspection Form.

1. The original (white) inspection report shall be retained by the company officer until forwarded to the Fire Prevention Division in accordance with Section VI. A record of follow-up activities shall be recorded on the original form, utilizing the back of the form if required for narrative.

2. The original (white) inspection form is a legal document. The information recorded on the form will be utilized for prosecution when required.

B. Pre-citation Letter.

1. The original (white) pre-citation letter shall be attached to the original (white) inspection form and forwarded to the Fire Prevention Division.

2. The original (white) pre-citation letter is a legal document, and will be utilized for prosecution as required.

C. Computer entry.

1. An accurate record shall be entered into the computer by the company officer on a daily basis recording number of inspections and personnel hours invested according to the following categories:

a. Inspections.
b. Self-inspections.
c. Follow up (re-inspections).

APPENDIX B

Fire Department Inspections 1994 – 1998

	Engine Company Inspections	Self-Inspections	Business License Inspections	Building Construction Inspections	Total	Percent of Inspections by Engine Companies*
1994	1149	248	832	--**	2229	51.5%
1995	1054	140	755	120	2069	50.9%
1996	1065	381	654	155	2255	47.2%
1997	1265	0	859	201	2325	54.4%
1998	691	127	762	246	1826	37.8%
	5224	896	3862	722	10704	48.8%

* Self-Inspections excluded
** No data available

APPENDIX C

Number of Emergency Responses 1994 – 1998

	1994	1995	1996	1997	1998
Medical Responses	2586	2324	2331	2234	2123
Fire Responses	918	951	969	945	807
Total Responses	3504	3275	3300	3179	2930